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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/510,793	12/10/2004	Hans Kramer	13979	1815

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Orum & Roth
53 West Jackson Boulevard
Chicago, IL 60604

EXAMINER

RAO, G NAGESH

ART UNIT	PAPER NUMBER
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1722

DATE MAILED: 10/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/510,793	Applicant(s) KRAMER, HANS	
	Examiner G. Nagesh Rao	Art Unit 1722	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 06 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
1. Claims 1-20 rejected under 35 U.S.C. 103(a) as being unpatentable by Kramer (US Patent No. 5,462,427) in view of Heldt (DE Patent No. 29,706,270 U1).

Kramer 427 teaches a rotary tablet press wherein the specification and figure 1 teach the following device comprised of a mould shelf (15) that reads on as a type of rotating die table, an upper guide ring (13) that reads on stamp guide that is a type of reciprocating rod-like device with an upper and lower ram guide (22 and

23) that read on upper and lower stamps which are coaxial to the mold (as seen in figure 1), elastic ram sealing elements capable of rotational symmetry and attachable with their base section to the ram guide ring to form a seal between the ram guide and mould shelf, whereby the sealing element is capable of having base section with an undercut (Col 4 Lines 25-67 and Col 5 Lines 1-20).

Kramer 427 lacks the specific teaching of incorporating a base and sleeve section that forms a scraper lip on the side edge of the reciprocating rod in an abutting manner to form a seal.

In an apparatus pertaining to sealing mechanisms for reciprocating rods, Heldt 270 depicts in figures 1-3 a scraper lip (6') with a scraper surface (13') against the reciprocating rod (12) with a surface structure (17), whereby the use of the scraper is for the removal of particles from the rod when coupled with the cylinder and its advantage allows for the scraper lip structure to prevent leakage of material through the scraping action of particles outward.

It would be obvious to one skilled in the art to modify the apparatus of Kramer 427 with the teachings of Heldt 270, whereby the scraper lip sealing mechanism when coupled to the reciprocating rod is advantage to use do to its ergonomic design and easily attachable and replaceable due to wear and tear without having to replace the apparatus completely.

Response to Arguments

In response to applicant's argument that Heldt (DE Patent No. 29,706,270 U1) is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, the problem at hand was having an abutting scraper lip attached to the underside of the piston rod, formed from the incorporation of a base and sleeve section. Primary reference Kramer (US Patent No. 5,462,427) taught a sealing and scraping mechanism but failed to address the aforementioned problem. Whereas secondary reference Heldt 270 (Included in this action is an English translation of Heldt 270 for further clarification and understanding of the reference used in the prior rejection.) pertained reciprocating rod-like devices and taught a sleeve section and base attached to the underside of the piston rod to scrape off dirt particles from the rod. Therefore it would be obvious to modify Kramer 427 with the teachings of Heldt 270, since Kramer 427 teaches the primary elements of applicant's claimed invention, and where Heldt 270 addresses the minor difference with a different means of particle removal and foreseeing from the combination of references lead to

the design being ergonomic, easily attachable and replaceable due to wear and tear without having to replace the apparatus completely. Applicant's arguments filed 9/6/05 have been fully considered but they are not persuasive.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to G. Nagesh Rao whose telephone number is (571) 272-2946. The examiner can normally be reached on 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on (571) 272-1166. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

GNR


ROBERT DAVIS
PRIMARY EXAMINER
GROUP 1300-1722

10/3/05

PTO 05-4250

CY=DE DATE=19971106 KIND=U1
PN=297 06 270*

SCRAPER
[ABSTREIFER]

DICHTELEMENTE HALLITE GMBH

UNITED STATES PATENT AND TRADEMARK OFFICE
Washington, D.C. June 2005

Translated by: FLS, Inc.

PUBLICATION COUNTRY	(10):	DE
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PUBLICATION DATE	(43):	19971106
APPLICATION NUMBER	(21):	297 06 270.0
APPLICATION DATE	(22):	19970409
INTERNATIONAL CLASSIFICATION	(51):	F15B 15/08; F16J 15/32; F16J 15/56
PRIORITY COUNTRY	(33):	NA
PRIORITY NUMBER	(31):	NA
PRIORITY DATE	(32):	NA
INVENTOR	(72):	NA
APPLICANT	(71):	DICHTELEMENTE HALLITE GMBH
TITLE	(54):	SCRAPER
FOREIGN TITLE	[54A]:	ABSTREIFER

Description:

/1*

The invention relates to a scraper, especially as a seal between a piston rod and a hydraulic cylinder with an inner end turned toward a higher pressure and an outer end turned away from the inner end that is designed as a ring-shaped scraper lip.

Scraper and/or dirt scraper are usually mounted as seals in hydraulic cylinders that primarily act toward the outside - toward lower pressure. In hydraulic cylinders, scrapers have the task of scraping the adhering dirt particles from the piston rod. This is necessary since the dirt particles otherwise pass over the seal mounted in front of the scraper into the interior of the cylinder. The consequence would be mechanical damage of the seals, guides and the surfaces of cylinders and piston rods. Scrapers that are distinguished by high elasticity and tension force are used to achieve a good dirt-scraping effect. In this case, the scraper lip is pressed against the surface of the piston rod with a force such that the dirt can reliably be kept away from the sensitive internal parts of the hydraulic cylinder.

The disadvantage of the known scrapers is that the dirt is actually reliably kept away due to relatively high contact pressure, but at the same time the oil film or lubricant film adhering to the piston rod is undesirably scraped away and/or interrupted by the scraper lip. Oil rings form on the surface of the piston rod in front of the scraper lip and drips from the piston rod as visible leakage.

*Numbers in the margin indicate pagination in the foreign text.

Thus the object of the present invention is to improve the known scraper in such a way that, in spite of good scraping effect of the scraper lip with respect to dirt, oil leakage is reduced as a result /2 of scraping of the lubricant film toward the outside.

Because of the increased roughness of the scraper surface, a condition is achieved where the scraper surface has a certain porosity so that the lubricant film can pass through while dirt particles are scraped off. The oil can then run back again through the pores into the cylinder. The outer leakage is thus at least reduced.

According to a preferred embodiment of the invention, the surface structure has a large number of adjacent hills and valleys, whereby the distance between two hill tops is at least $2/100$ mm on the average and the depth of a valley is at least $5/1000$ mm on the average. Because of this, a surface structure is advantageously produced that reduces the friction with respect to the piston rod, does not break down the lubricant film and greatly reduces the external leakage.

According to another preferred embodiment of the invention, the distance between two hill tops is about $2/10$ mm on the average and the depth of a valley is about $5/100$ on the average. Because of this, the external leakage can be practically completely prevented.

According to a preferred embodiment, the scraper is manufactured from polyurethane. Because of the use of polyurethane, a high elasticity and tension force is achieved. However, other plastics with properties similar to polyurethane can also be used.

For example, polyester is also suitable.

According to a preferred embodiment of the invention, the scraper surface of the scraper lip adjacent to the piston rod is designed as a circumferential collar that can be arranged outside the hydraulic cylinder. This achieves an encapsulation of the installation space and the slot corrosion that normally occurs in this area is prevented.

According to another preferred embodiment of the invention, the scraper surface adjacent to the piston rod is designed as a contact surface arranged essentially inside the hydraulic cylinder. Because of the relatively large scraper surface and the arrangement of the scraper lip essentially inside the hydraulic cylinder, the scraper can be used even under extreme stresses that act on it from the environment of the hydraulic cylinder.

According to another preferred embodiment of the invention, the scraper is manufactured in an injection mold by heat deformation of an elastic plastic material.

The mold surface of the injection mold adjacent to the scraper surface of the scraper lip has a surface structure with increased roughness. The surface structure can be manufactured, e.g., by using a sand blasting method. Because of the fact that the mold surface of the injection mold generating the scraper surface has the surface structure desired for the scraper surface the scraper can be manufactured in one work step, in spite of different surface structures. The scraper surface thereby receives, in a simple way, a surface structure that corresponds to a sand-blasted surface.

Other details of the invention can be seen from the following detailed description and the attached drawings, in which preferred embodiments of the invention are shown as examples.

The following are shown in the drawings:

/4

Figure 1 shows a cutout in cross section through an arrangement of primary gasket and scraper designed as a double scraper mounted in front of it in its guide hole of a hydraulic cylinder with piston rod,

Figure 2 shows an enlarged cross section through a scraper designed as a double scraper,

Figure 3 shows a cross section representation, which as a left half section shows a hydraulic cylinder with piston rod and as a right half section a scraper with scraper surface arranged outside the hydraulic cylinder,

Figure 4 shows a cross section representation, which in the left half section shows a hydraulic cylinder with piston rod and in the right half section shows a scraper with scraper surface lying inside the hydraulic cylinder and

Figure 5 shows an enlarged representation of the roughness profile of a surface structure.

A scraper (10) essentially consists of an inner end (2) turned toward a chamber with elevated pressure, an outer end (3) turned away from the inner end (2) and a center part (4) connecting the two ends (2, 3) with each other. The outer end (3) is delimited by a ring-shaped scraper lip (6).

For use as a double scraper (7), the inner end (2) is designed as a grooved ring (8) with a groove (9) on the face side. On its outside (26) turned away from a center line (5), the outer end (3) can have an additional lip (10) pointed toward the inner end (2).

The contact pressure of the scraper lip (6) can be influenced /5 by the dimensioning of the additional lip (10). To decrease the contact pressure of the scraper lip, the additional lip (10) can be provided with a circumferential notch (11). A scraper surface (13) of the scraper lip (6) of a piston rod (12) is designed as a circumferential collar (15) arranged outside a hydraulic cylinder (14). However the scraper surface (13') adjacent to the piston rod (12) can also be designed as a contact surface (16) arranged essentially inside the hydraulic cylinder (14).

The scraper surface (13, 13', 13'') has a surface structure (17) with a number of very small hills (18) and valleys (19) adjacent to each other. The distance (20) between two hill tops (21) is about 2/10 mm on the average and the depth (22) of a valley (19) is about 5/100 mm on the average.

The scraper (1) is manufactured of a plastic material, especially polyurethane or polyester, by hot forming. An injection mold not shown is used for manufacturing in an injection molding process. On its molding surface adjacent to the scraper surface (13, 13', 13'') of the scraper lip (6, 6', 6'') the injection mold has a surface structure with increased roughness that corresponds to a mirror image of surface structure (17). The surface structure of the mold surface that creates

the scraper surface (13, 13', 13'') is manufactured, e.g. using a sand blast method.

Instead of sand, glass beads or other suitable material or a suitable mixture can be used for manufacturing the desired surface structure. In addition, the hills (18), whose hill tops (21) maintain a distance of at least 2/100 mm and the valleys (19) that have a /6 minimum depth (22) of 5/1000 mm can be created in all conceivable ways.

The contact pressure of the scraper lip and/or the scraper surface (13, 13', 13'') with respect to the piston rod (12) can be produced with a number of parameters, for example, in that the material of the scraper (1, 1', 1'') is selected appropriately. Besides that, different magnitudes can be selected for the prestress with which the scraper (1) contacts the piston rod (12). Also, the contact pressure can be influenced by the dimensioning of the additional lip (10) and by the dimensioning of a scraper bracket (23) of the hydraulic cylinder (14, 14', 14'').

In order to decrease the contact pressure, the scraper lip (6) can have a notch (24) or be designed so that it is appropriately thin. In general, a primary seal (25) is mounted inward in front of the scraper (1). Because of the scraper lip (6) of the scraper (1), foreign objects and/or dirt particles adhering to the piston rod (12) are scraped off. Because of the surface structure (17), the lubricant film adhering to the piston rod is maintained during the back-and-forth movement of the piston rod (12), while dirt particles continue

to be scraped off.

Claims:

17

1. Scraper, especially for sealing a piston rod and a hydraulic cylinder with an inner end turned toward a higher pressure and an outer end turned away from the inner end, which is designed as a ring-shaped scraper lip, characterized in that the scraper lip (6, 6', 6'') has a surface structure (17) with increased roughness on its scraper surface (13, 13', 13'') adjacent to the piston rod (12).

2. Scraper according to Claim 1, characterized in that the surface structure (17) has a number of very small hills (18) and valleys (19) lying next to each other, whereby the distance (20) between two hill tops (21) is at least 2/100 mm on the average and the depth (22) of a valley (19) is at least 5/1000 mm on the average.

3. Scraper according to Claim 2, characterized in that the distance (20) between two hill tops (21) is about 2/10 on the average and the depth (22) of a valley was about 5/100 mm on the average.

4. Scraper according to one of Claims 1 to 3, characterized in that for use as a double scraper (7), the inner end (2) is designed as a groove ring (8) with a groove (9) on the face side.

5. Scraper according to one of Claims 1 to 4, characterized in that, on its outside turned away from the symmetrical axis, the outer end (3) has an additional lip (10) pointed toward the inner end (2).

6. Scraper according to Claim 5, characterized in that the contact pressure of the scraper lip (6) can be influenced by dimensioning of the additional lip (10).

7. Scraper according to Claim 6, characterized in that to /8
decrease the contact pressure of the scraper lip (6), the additional
lip (10) is provided with a circumferential notch (11).

8. Scraper according to one of Claims 1 to 7, characterized in
that the contact pressure of the scraper lip (6, 6', 6'') can be
influenced by the dimensioning of a scraper bracket (23, 23', 23'') in
the hydraulic cylinder (14, 14', 14'').

9. Scraper according to one of Claims 1 to 8, characterized in
that the contact pressure of the scraper lip (6') can be influenced by
a circumferential notch (24) of the scraper lip (6').

10. Scraper according to one of Claims 1 to 9, characterized in
that the scraper surface (12, 13') of the scraper lip (6, 6') adjacent
to the piston rod (12) is designed as a circumferential collar (15,
15') that can be arranged outside the hydraulic cylinder (14, 14').

11. Scraper according to one of Claims 1 to 9, characterized in
that the scraper surface (13'') of the scraper lip (6'') adjacent to
the piston rod is designed as a contact surface (16) that can be
arranged essentially inside the hydraulic cylinder.

12. Scraper according to one of Claims 1 to 12, characterized in
that plastic is used as the material.

13. Scraper according to Claim 12, characterized in that
polyurethane is used as the plastic.

14. Scraper according to Claim 12, characterized in that
polyester is used as the plastic.

15. Injection mold for manufacturing a scraper according /9
to Claim 1 in the injection molding method, characterized in that the
molding surface adjacent to the scraper surface (13, 13', 13'') of the
scraper lip (6, 6', 6'') has a surface structure with increased
roughness.

16. Injection mold according to Claim 15, characterized in that
the surface structure of the mold surface has a number of very small
hills (18) and valleys (19) lying adjacent to each other, whereby the
distance between two hill tops (21) is at least 2/100 mm on the
average and the depth (22) of a valley (19) is at least 5/1000 mm on
the average.

17. Injection mold according to Claim 16, characterized in that
the distance (20) between two hill tops (21) is about 2/10 mm on the
average and the depth (22) is about 5/100 mm on the average.

18. Injection mold according to one of Claims 15 to 17,
characterized in that the surface structure of the mold surface
adjacent to the scraper surface (13, 13', 13'') can be manufactured by
a sand blasting process.

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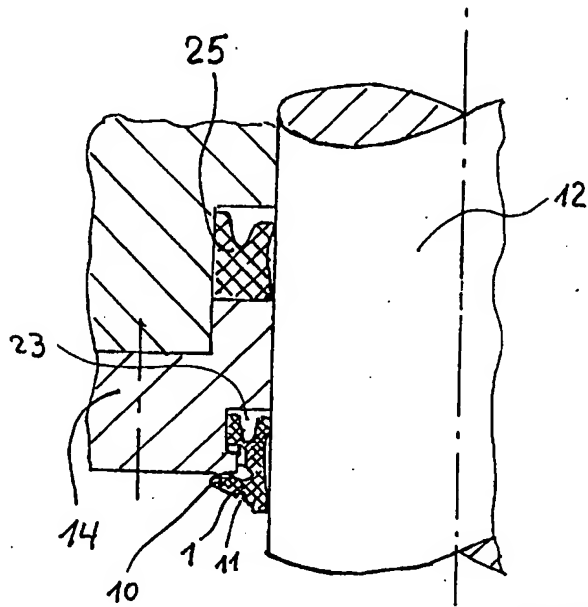


Figure 1

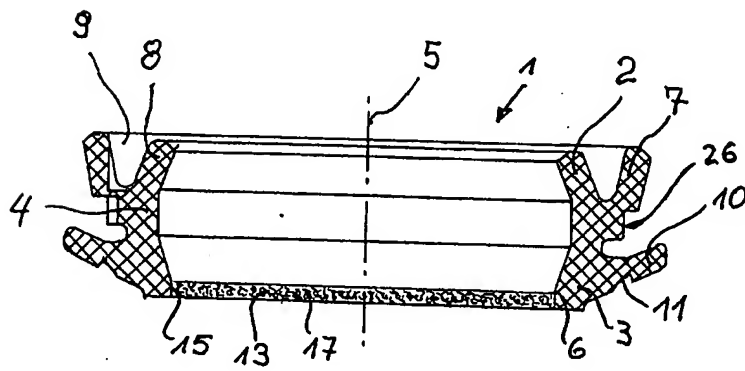


Figure 2

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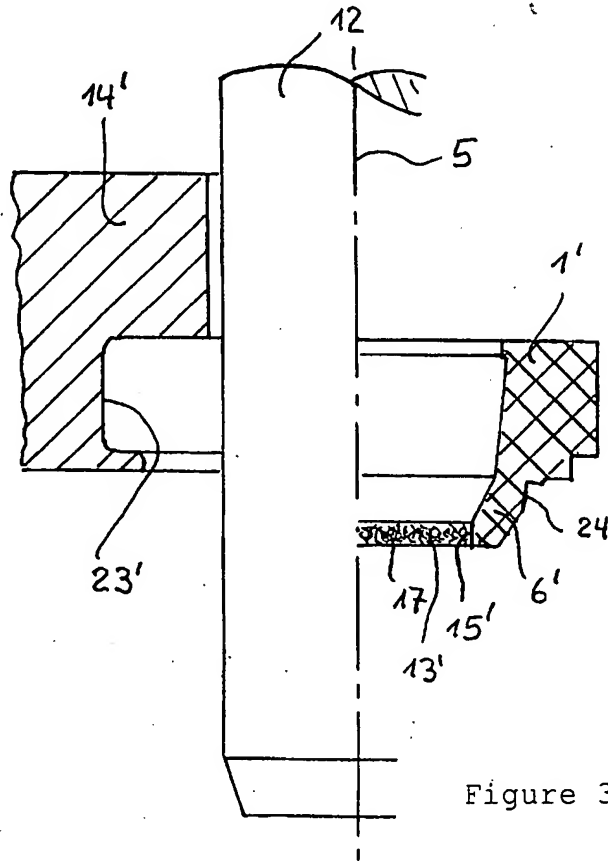
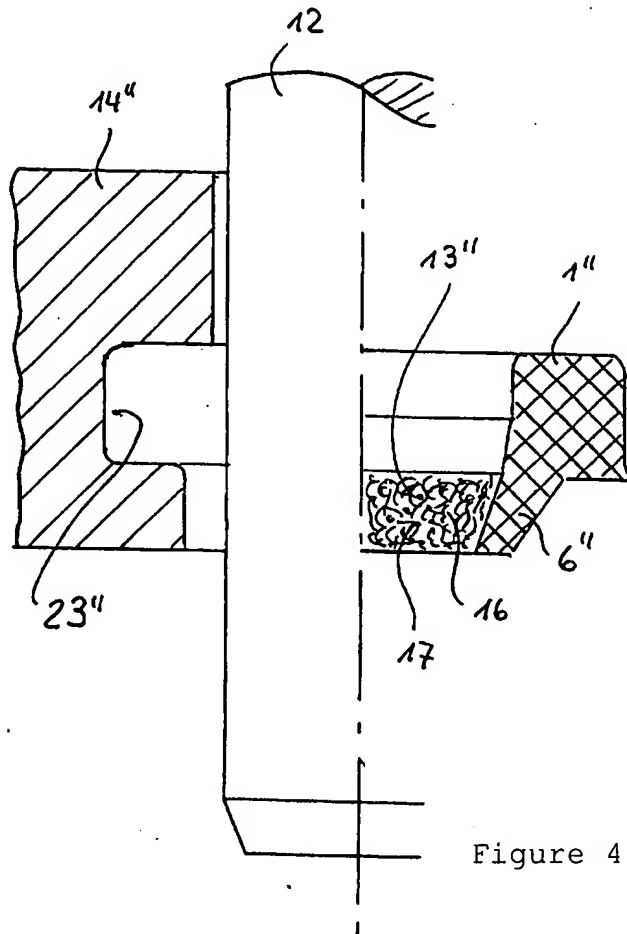


Figure 3

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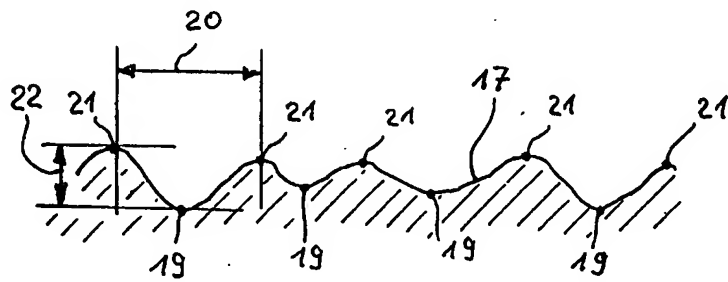


Figure 5